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COLLIMATING A NAVY BINOCULAR

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GOLDEN GATE PARK · SAN FRANCISCO

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September Announcement

The regular September meeting of the California Academy of Sciences will be held in Room 214, Simson African Hall on Wednesday, September 12, 1945, at 3:00 p.m. The speaker will be Dr. Richard M. Eakin, Chairman of the Department of Zoölogy, University of California, who will take as his subject:

Structural and Functional Adaptations of the Vertebrate Eye

The most complicated as well as the most useful optical instrument known is the vertebrate eye. Anyone who works with optical instruments becomes increasingly impressed with the complexity, versatility, and refinement of the vertebrate organ of vision, particularly in the higher vertebrates. Dr. G. L. Walls has remarked: "Man can make optical instruments only from such materials as brass and glass. Nature has succeeded with only such things as leather and water and jelly; but the resulting instrument is so delicately balanced that it will tolerate no tampering."

Dr. Eakin will discuss the vertebrate eye particularly from the standpoint of its adaptation to special functions, such as nocturnal vision, vision under water, and alternating or combined aerial and aquatic vision, as in amphibians and amphibious fishes, reptiles, birds, and mammals.

The public is cordially invited.

Applications for Membership

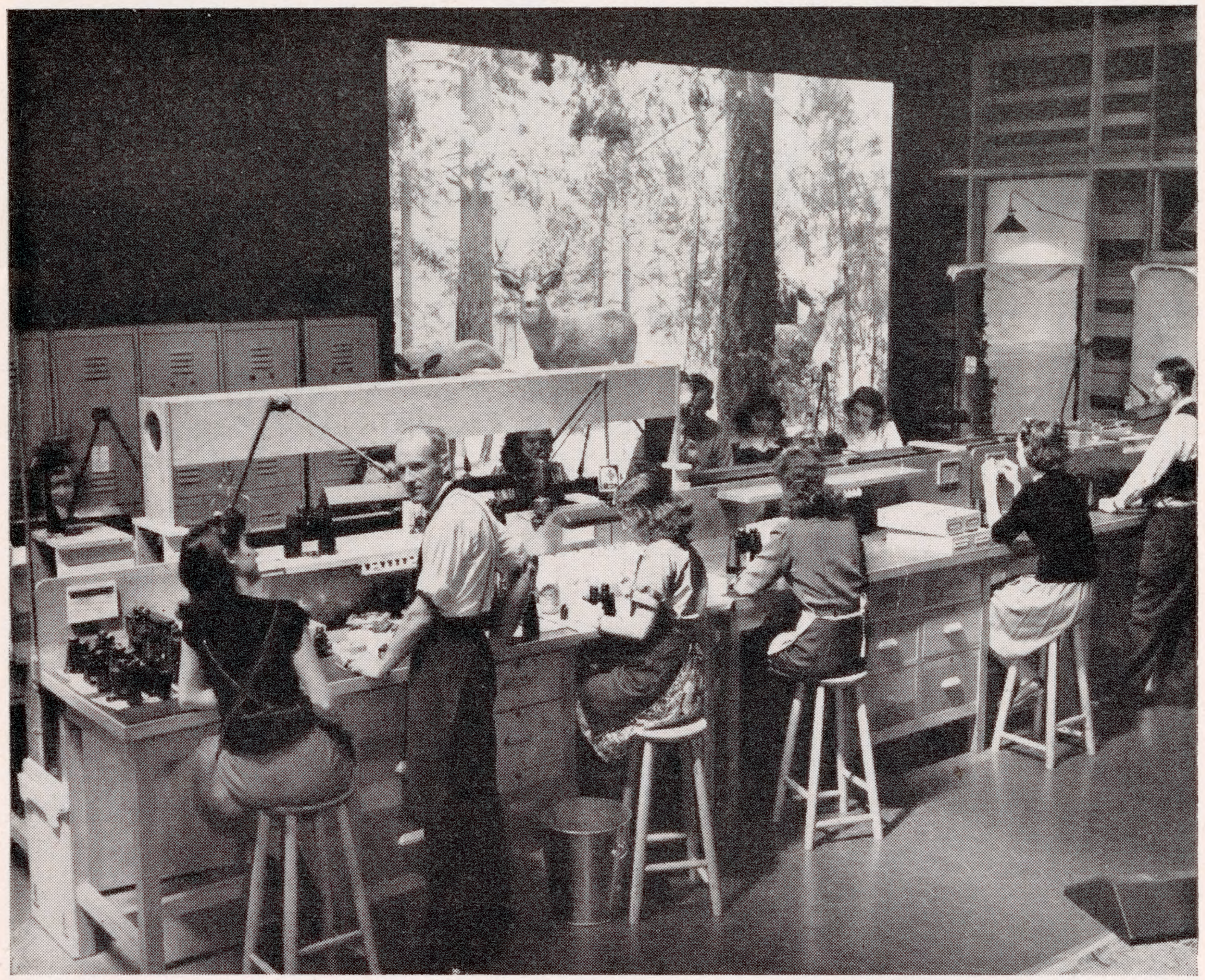
Notice is hereby given to all Corporate Members that the Council at its meeting on August 14, 1945, approved the applications of Mr. Francis J. Miller and Mr. Lawrence A. Williams, Jr., for Membership, and of Mr. Philip Applebaum, Mr. William Feldman, Mr. Robert Garfias, Mr. Morley Henrich, Mr. James Kain, Mr. Ted Kesler, Mr. William Miller, Mr. William A. Newman, Mr. Roba Lee Wrenn, and Mr. Edward D. Zinn, Jr., for Student Membership in the California Academy of Sciences. If no objection to the election of these applicants be received at the office of the Academy within two weeks after August 31, they will be considered elected.

Eyes for the Navy

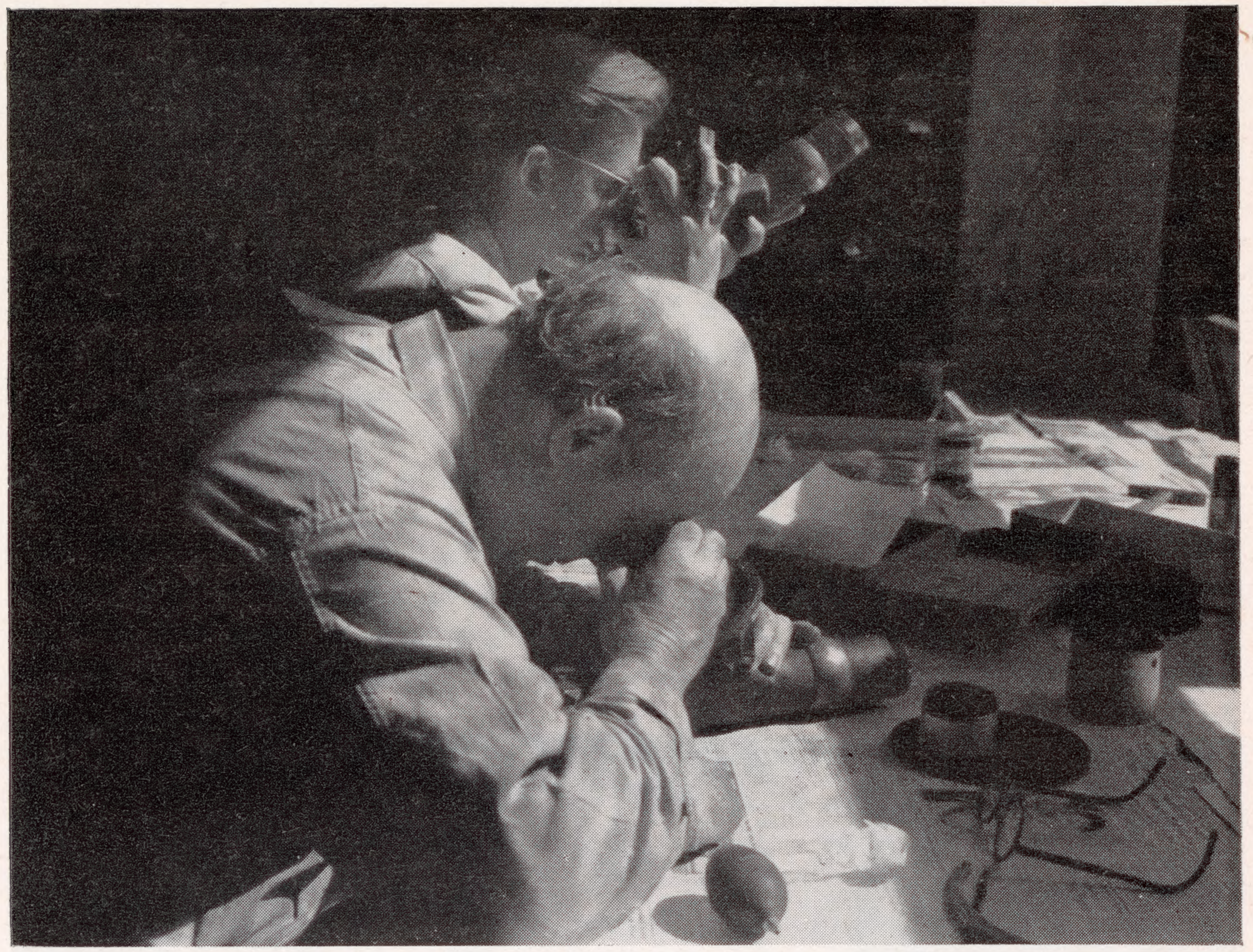
In the dusk that swiftly follows sunset in the tropics, the Commander of a destroyer leading a convoy scans the horizon. On the deck below, a gun crew stands by, alert to any possibility of enemy action in the gathering darkness. Officers and men alike sense keenly the responsibility that rests upon them; but in all probability they are unaware of the extent to which that responsibility is shared by a museum curator in San Francisco—who set the crosslines in that gunsight. The Commander would further be surprised if he knew that his ever-present binoculars contained prisms ground and polished in a Paleontology laboratory, that they had been carefully locked in place by a Curator of Fishes, and that the instrument had finally been collimated by an army wife working in a Natural History Museum.

But we are reminiscing. The war is over! From the shore of a far Pacific island a transport bearing a thousand victorious but battle-weary men stands out to sea. The Captain sets a course for home. Many things contribute to the success of the voyage. One is a small, highly polished black mirror which forms a vital part of a navigation instrument—an obsidian mirror cut and polished in the Optical Shop of the California Academy of Sciences.

For many months past, visitors to the Academy have noticed a partition across the Hall of North American Mammals, cutting off about one-third of the hall. From behind the partition came strange and interesting noises, subdued voices and sounds of mechanical equipment; but any effort to get behind the scenes brought one up against locked doors, some of them bearing inhospitable admonitions—"No Admittance, Apply at Office." Gradually it became known that the Academy was



A NATURAL HISTORY DIORAMA PROVIDES A DRAMATIC BACKGROUND FOR THE ACADEMY'S WARTIME OPTICAL SHOP



REPAIRING ANTIAIRCRAFT GUNSIGHTS

carrying on a special project for the United States Navy; but for security reasons many aspects of the work could not be made public until the end of the war.

In 1941, when it became apparent that America must gird for war, the Council of the Academy asked the Director to make a survey of all possible ways in which the Academy's staff and facilities might contribute to the national defense, and to offer the services of the Academy to the United States Government. The survey indicated that there were at least six technical lines along which the Academy might be of assistance, and the Director communicated this information to the Secretary of the National Research Council, the Chairman of the National Defense Research Committee, the Secretary of the Navy, and the Commandant of the Twelfth Naval District.

One of the services offered was the repair and manufacture of parts for optical and other precision instruments. The Academy maintained a small instrument shop for the manufacture and repair of its own research equipment. This shop was in charge of Dr. G. Dallas Hanna, Curator of Paleontology, an authority on the optics of the microscope and developer of several well-known mounting media, including Hyrax, Pleurax, and Realgar. Mr. Albert S. Getten was also employed in the shop as instrument maker.

As matters developed, the first call for precision optical work came from the United States Army. The Academy received a contract from the Frankfort Arsenal for the manufacture of a special type of prism used in range finders, of which there was at that time an acute shortage. Dr. Hanna spent two weeks at the Arsenal in Philadelphia learning their methods of production, then returned to San Francisco to execute the contract. He was joined by Mr. Joseph Slevin, Curator of Herpetology, Mr. Allyn G. Smith, Research Associate in Paleontology, and two amateur telescope makers, Messrs. J. E. Steinback and F. G. Corrigan, all of whom volunteered their services, working evenings, Saturdays, and Sundays.

In the meantime the Academy's facilities were investigated by the Navy. Lieutenant Commander F. R. Kalde, head of the Optical School at Mare Island, stated in an official report that the Academy was in a position to provide certain services of a type which the Navy had been unable to obtain elsewhere on the Pacific Coast. In substantiation of this report, Dr. Hanna, working over a week end, produced an optical part for a submarine periscope which had been out of service a month for the lack of this vital element. Shortly thereafter the Director of the Museum was startled to receive a contract from the Navy for one hundred thousand dollars worth of work in the repair and servicing of optical and navigation instruments. In a few weeks this was replaced by another contract which raised the amount to one hundred and twenty-five thousand dollars.

This seemed a large order for an instrument shop hardly bigger than a bath-

POLISHING A TWELVE-INCH LENS

GRINDING BINOCULAR PRISMS TO SIZE

room, manned by a couple of museum curators, an instrument maker, and three or four part-time volunteers. Dr. Hanna and Mr. Slevin elected to work sixty hours a week in the shop, doing their curatorial work in their spare time! The Director began working evenings in the shop. Other volunteer assistants came in—an engineer for a large corporation, a stationary engineer from the Steinhart Aquarium, a marine engineer, an Aquarium biologist, a Southern Pacific Railroad conductor. On the recommendation of an instructor at Polytechnic High School, two high school students were employed, one of them a Chinese-American. They learned rapidly and did excellent work, but soon were drafted. It became evident that, if the project were to go on, woman-power would have to be used.

So women were hired, somewhat dubiously at first, and with many misgivings concerning their mechanical ability. Many had no previous experience, and it was difficult to appraise their aptitude. In interviewing applicants, the Director hit upon a sixty-four dollar question: "Can you put a new washer in a leaky faucet in the kitchen sink?" Any woman who could do that was hired.

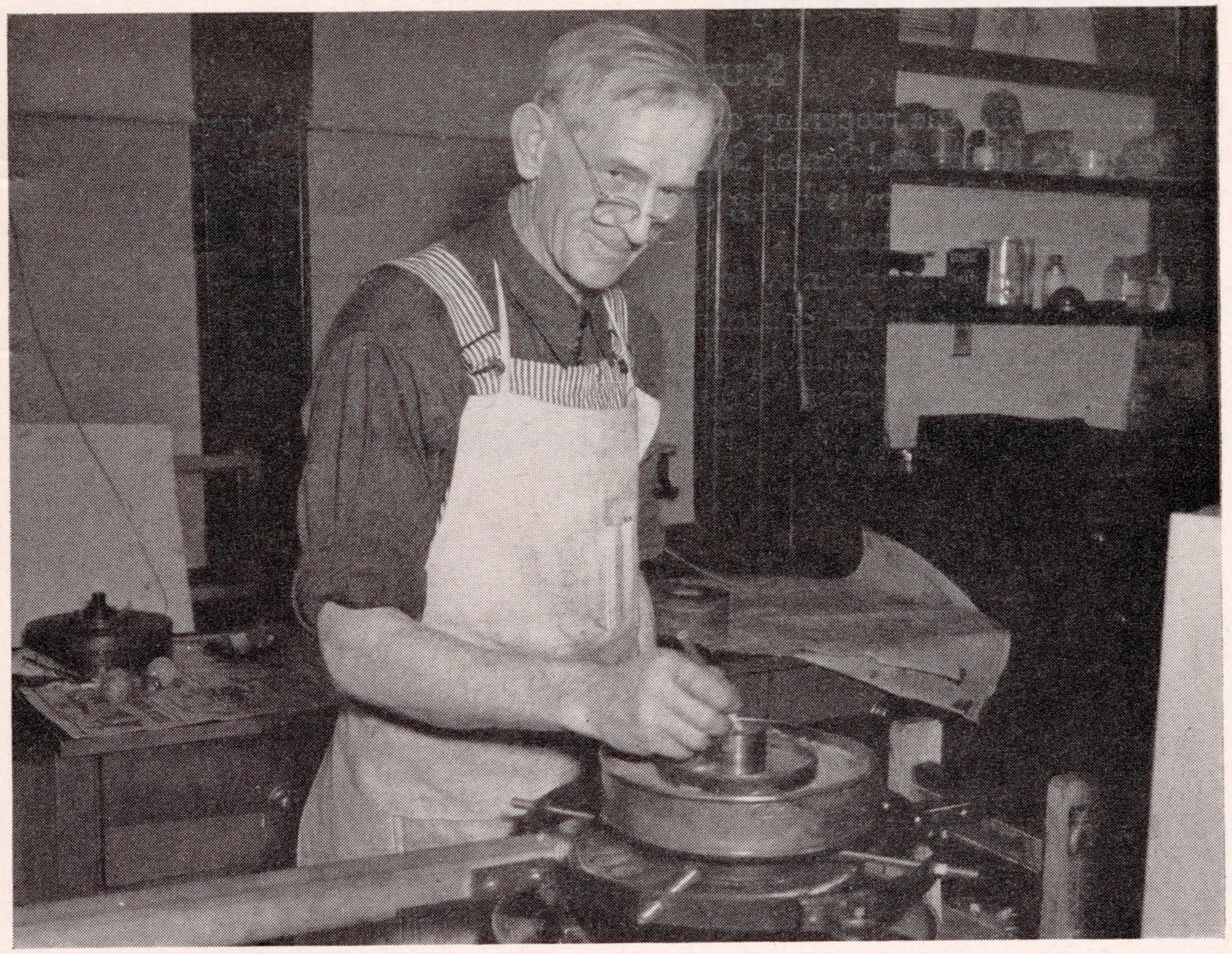
Gradually, women came into a majority in the organization, and for many months they have outnumbered the men two to one.

As the war in the Pacific approached its climax, the number of employees increased to fifty, and for a period of months the standard work week was fifty-four hours, with occasional sixty-hour weeks in periods of emergency. Much of the work was done against time. A ship, scheduled to sail on a given date, must have its binoculars, quartermaster telescopes, gunsights, and navigation instruments reconditioned and aboard before sailing time. In a citation of the Academy's Optical Shop by the War Manpower Commission last April, it was stated: "Performing work of the most exacting nature in the repair and reconditioning of optical and navigation instruments, these men and women have never failed to meet a deadline for the sailing of a ship."

Instruments sent in for repair included binoculars, straight-line telescopes, gunsights, sextants, azimuth circles, bearing circles, alidades, stadimeters, barometers, and anemometers. All in all, more than 9,000 separate instruments were rebuilt or repaired, and at peak production the number of instruments turned out exceeded 800 per month. No accurate record is conveniently available of the number of prisms, sextant mirrors, and other optical parts manufactured or resurfaced, but the number certainly runs into the tens of thousands.

At the time this work was in progress, the Academy also carried out specific undertakings in related fields for Stanford University, the University of California Radiation Laboratory, and the United States Army Air Forces.

Now that the war is over, the museum curators have suddenly come to the point of being able to say to one another, "Where was I when I was interrupted?" Re-



POLISHING BINOCULAR PRISMS

conversion for them means taking off an apron, walking upstairs, and resuming some favorite research problem, content in the knowledge of an unusual but necessary job well done.

Academy Publications Needed!

The end of the war and the urgent need for rebuilding libraries in both Europe and Asia brings with it an unprecedented demand for Academy publications. Members who may have copies of the Proceedings or Occasional Papers on subjects outside their special fields of interest may be willing to give them up. Please bring or send any unwanted publications to the office of the Academy, Room 207 Simson African Hall, Golden Gate Park.

New Exhibits for September

Representative of wartime nutrition campaigns is the ABC Health Poster Exhibit in North American Hall. These posters were designed for the instruction of the home front populations of America, Britain, and China. Of special interest is the series of Chinese posters, in which the Chinese script has been partially translated into English by Col. Paul E. Howe of the United States Sanitary Corps.

An unusual collection of sponges presented to the Academy is also on display in North American Hall. The sponges were collected from the Bering Sea by John H. Hower of the United States Engineers. Of varied shapes, they range in size from two inches to a foot in length.

Student Activities

Coincident with the reopening of the public schools for the fall semester, regular meetings for Junior and Senior Student Members will be resumed. A schedule of meetings and field trips is being drawn up, announcements of which will reach Student Members by mail.

A clubroom project recently instituted is an exhibit of common wild flowers. Students participate in the collection, classification, and display of the specimens.

The collection of live animal pets in the clubroom is reaching the proportions of a small zoo. Early in August the terrarium populace was substantially increased by the appearance of a litter of seventeen Redwood garter snakes.

Section 562 P.L. & R.